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Alcataenia campylacantha (Krabbe, 1869) from pigeon guillemots, *Cepphus columba* Pallas, and black guillemots, *Cepphus grylle* (Linnaeus), and *Alcataenia* sp. indet. (Cestoda: Dilepididae) from Kittlitz's murrelets, *Brachyramphus brevirostris* (Vigors) in Alaska

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Alcataenia campylacantha (Krabbe, 1869) from pigeon guillemots, *Cepphus columba* Pallas, and black guillemots, *Cepphus grylle* (Linnaeus), and *Alcataenia* sp. indet. (Cestoda: Dilepididae) from Kittlitz's murrelets, *Brachyramphus brevirostris* (Vigors) in Alaska

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Alcataenia campylacantha (Krabbe, 1869) is redescribed and reported for the first time from pigeon guillemots, *Cepphus columba* Pallas, in Alaska. Specimens of this cestode were also found in black guillemots, *Cepphus grylle* (Linnaeus) at Point Barrow, Alaska. There were no substantial differences in morphological characters between populations of this cestode from the North Atlantic and North Pacific basins. Additionally, *Alcataenia* sp. indet. is reported, with a partial description, from Kittlitz's murrelets, *Brachyramphus brevirostris* (Vigors), in Alaska. This constitutes the first record of dilepidid cestodes from birds of the genus *Brachyramphus* Brandt.

HOBERG, E. P. 1984. *Alcataenia campylacantha* (Krabbe, 1869) from pigeon guillemots, *Cepphus columba* Pallas, and black guillemots, *Cepphus grylle* (Linnaeus), and *Alcataenia* sp. indet. (Cestoda: Dilepididae) from Kittlitz's murrelets, *Brachyramphus brevirostris* (Vigors) in Alaska. Can. J. Zool. **62**: 2297–2301.

On trouvera ici une nouvelle description d'*Alcataenia campylacantha* (Krabbe, 1869) rencontré pour la première fois chez des guillemots du Pacifique, *Cepphus columba* Pallas, en Alaska. Le cestode a également été trouvé chez des guillemots à miroir *Cepphus grylle* (L.) en Alaska. Il n'existe pas de différences morphologiques importantes entre la population du bassin de l'Atlantique Nord et celle du bassin du Pacifique Nord. Un autre cestode, *Alcataenia* sp. indét. a été trouvé chez des alques pâles, *Brachyramphus brevirostris* (Vigors) en Alaska; on en trouvera ici une description partielle. Il s'agit là de la première découverte d'un cestode dilapididé chez des oiseaux du genre *Brachyramphus* Brandt.

[Traduit par le journal]

Introduction

Alcataenia campylacantha (Krabbe, 1869) is a typical cestode of birds of the holarctic genus *Cepphus* Pallas. The distribution of this cestode appears to coincide with that of its hosts. It has been reported from the Pacific basin by Belopol'skaia (1963*a*, 1963*b*) and Smetanina (1979), who found it in spectacled guillemots, *Cepphus carbo* Pallas, but it has not previously been recorded from pigeon guillemots, *C. columba* Pallas. Specimens of *A. campylacantha* from the North Atlantic and the North Pacific have not been compared morphologically.

In Alaska, specimens of *A. campylacantha* have been collected from guillemots, *C. columba* (Ugaiushak Island, Kodiak Island, St. Lawrence Island, and St. Matthew Island) and *C. grylle* (Linnaeus) (Point Barrow) over a period of many years. A redescription of this taxon was prepared from this material and compared with earlier descriptions of specimens from the North Atlantic (Krabbe 1869; Baer 1956) and the Arctic basin (Skriabin 1926). In addition the type series and other specimens considered by Baer (1956, 1962) were reexamined during the present study. Although there were no substantial differences between the series of *A. campylacantha* representing populations from the North Pacific and North Atlantic, it was found that Baer (1956) did not fully evaluate the degree of variation exhibited by the latter.

Cestodes provisionally referred to *Alcataenia* Spasskaia, 1971 were found in two Kittlitz's murrelets, *Brachyramphus brevirostris* (Vigors), at Kodiak Island, Alaska. These cestodes were immature, with only a few segments composing each strobila. Although the form and length of the rostellar hooks indicated that these cestodes cannot be referred to any known taxon, they are most similar to *Alcataenia larina* (Krabbe, 1869), *A. cerorhincae* Hoberg, 1984, and *A. fraterculae* Hoberg, 1984 (see Hoberg 1984*a*).

In the present paper, *Alcataenia campylacantha* from guillemots in the eastern North Pacific and the Bering Sea is redescribed. In addition, a partial description of *Alcataenia* sp. indet. is presented.

Methods and materials

Cestodes from pigeon guillemots collected at Ugaiushak Island and St. Matthew Island, Alaska, were fixed in boiling 10% Formalin following a period of relaxation in water. Other specimens from *C. columba* and *C. grylle* in Alaska were provided by colleagues. Cestodes from murrelets were also fixed in boiling Formalin. All were stained in Semichon's acetic carmine and mounted entire. In some cases the rostellar hooks were mounted separately to ensure accuracy of measurements and determination of their form.

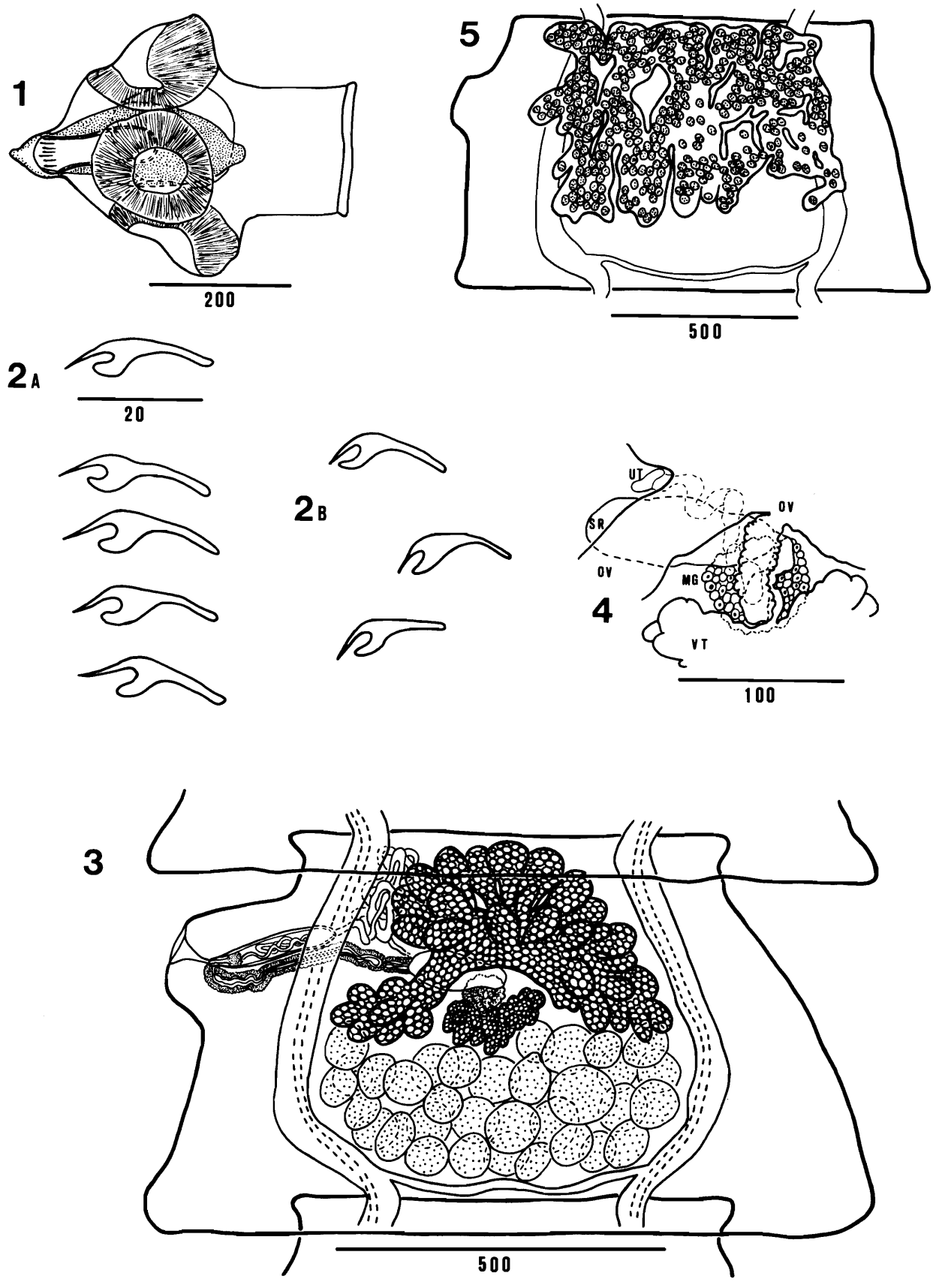
The following redescription of *A. campylacantha* is based on 30 specimens mounted entire. The partial description of *Alcataenia* sp. indet. from *B. brevirostris* is based on measurements from 20 scolices. In these descriptions, the sample size (*N*) for a particular measurement is given, followed by the range and the mean value in parentheses. All measurements, unless stated otherwise, are in micrometres.

Other specimens examined were the following: Type series of *A. campylacantha* (Krabbe, 1869) from *Cepphus grylle* in Greenland and the Faeroe Islands (leg. Pfaff and Berg, respectively), reported by Krabbe (1869) (Mus. Hist. Nat. Genève, Nos. 84/61–68). *Alcataenia campylacantha* from *C. grylle* at Diskfjord, Greenland and Hafnir, Iceland (leg. J. G. Baer, 22-VII-1955 and 28-VI-1959, respectively) reported by Baer (1956, 1962) (Mus. Hist. Nat. Genève, Nos. 108/25–32 and 122/79–82).

Alcataenia campylacantha (Krabbe, 1869)

Figs. 1–5

REDESCRIPTION: Strobila craspidote, from 81–96 mm long



FIGS. 1–5. *Alcataenia campylacantha* (Krabbe, 1869). Fig. 1. Scolex. Fig. 2. (A) Rostellar hooks from a cestode collected from *C. columba*. (B) Hooks from a cestode collected from *C. grylle*. Fig. 3. Mature segment. Fig. 4. Detail of female duct system. Fig. 5. Nearly gravid uterus showing reticulate structure.

and with up to 294 segments when gravid. Segments consistently wider than long; maximum width 2.08 mm. Length:width ratio in early mature segments 1:1.67–2.38; in mature 1:1.58–2.81; in gravid 1:1.53–2.56. Scolex (N = 30) 295–519 (379) in transverse diameter. Suckers (N = 95) 119–223 (178) in greater diameter. Rostellum (N = 25) 151–215 (191) long by 49–70 (59) wide at tip; armed with 26–33 (29) (N = 20 scolices) hooks in two alternating rows. Pattern of alternation in posterior:anterior rows generally 2:1:2:1:2:1 (hooks in one specimen alternated 1:1:1:1:1). Hooks in either row (N = 120) 21–29 (23.8) long; blade either longer or shorter than handle; blade:handle ratio 1:0.56–1.23. Rostellar sac (N = 24) 219–363 (303) long by 87–119 (108) wide, extending slightly beyond level of suckers. Dorsal excretory canals 9–23 in diameter; ventral canals 29–88; transverse canal 9–29. Genital pores irregularly alternating. Genital atrium, muscular, large, protruding prominently from lateral margin in anterior one-third of segment. Genital ducts passing between poral osmoregulatory canals. Genital *Anlagen* visible immediately posterior to neck; testes in 90th–115th segment; first ova appear in uterus 185th–200th; gravid with fully developed oncospheres by 260th–280th segment. Cirrus sac cylindrical occasionally reaching poral osmoregulatory canals; (N = 160) 93–203 (153) long by 20–35 (28) wide; containing coiled vas deferens. Cirrus unarmed. Vas deferens highly coiled, dorsal to ovary. Testes (N = 30 segments) 28–41 (35) in number; located posterior to female organs in 2–3 layers; (N = 125) 58–102 (74) in diameter. Vagina thick-walled, entering genital atrium posterior to cirrus sac. Seminal receptacle (N = 118) 96–223 (146) long by 44–110 (77) wide, dorsal to ovary and ventral to vitelline gland and Mehlis gland. Ovary initially reticulate; later highly lobed; situated on median line in anterior half of segment; bipartite, with smaller poral wing connected to larger antiporal wing by narrow isthmus; antiporal wing 319–531 long by 142–224 wide. Vitelline gland lobate, (N = 154) 116–212 (156) long by 44–90 (63) wide. Mehlis gland (N = 90) 46–73 (62) in diameter, situated slightly anterior to and dorsal to vitelline gland. Uterus arising from dorsal surface of Mehlis, passing porad of ovarian isthmus before descending to ventral surface. Uterus initially develops as a coarse, flat, reticulum visible ventrally in the anterior one-third of segment; sacculate in appearance when fully gravid. Eggs numerous, ovoid; outer envelope (N = 50) 64–90 (75) in diameter; embryophore (N = 50) 38–46 (43) long by 34–43 (37) wide; containing oncosphere (N = 50) 29–35 (32) long by 27–31 (29) wide. Embryonic hooks (N = 50) 13–15 (13.8) for median pairs; (N = 50) 15–17 (16.2) for lateral pairs.

HOSTS: *Cepphus columba* Pallas and *Cepphus grylle* (Linnaeus).

LOCALITIES: Ugaiushak Island, Kodiak Island, St. Lawrence Island, St. Matthew Island, and Point Barrow, Alaska.

HABITAT: Anterior one-fourth of the intestine.

VOUCHER SPECIMENS: USNM Helminthol. Coll. Nos. 78097 and 78098 from *C. columbua* at St. Matthew Island, 27-VII-1982 (three slides).

Alcataenia sp. indet.
Figs. 6–7

DESCRIPTION: Strobila craspidote; segments wider than long; maximum length 3.4 mm by 307 in width; with up to 45 segments. Scolex (N = 20) 261–413 (343) in transverse diameter. Suckers (N = 60) 110–197 (141) in greater diameter. Rostellum large, 305–421 long by 58–151 at apex; armed with 18–21 (20) hooks (based on 45 scolices where all hooks were present) in two regularly alternating rows. Hooks measure (N = 200) 73–96 (85) long; handle always much longer than blade; blade:handle ratio 1:1.44–2.12. Rostellar sac extending beyond level of suckers; 319–455 long by 116–145 wide. Genital pores irregularly alternating. Genital *Anlagen* visible immediately posterior to neck; testes discernable by 15th–20th segment. Testes distributed in 2–3 layers in posterior half of segment; (N = 8 segments) 16–21 (18) in number. Other organs not observed.

HOST: *Brachyramphus brevirostris* (Vigors).

LOCALITY: Kodiak Island, Alaska.

HABITAT: Anterior one-fourth of intestine.

VOUCHER SPECIMENS: USNM Helminthol Coll. No. 78099, collected 3-VI-1977.

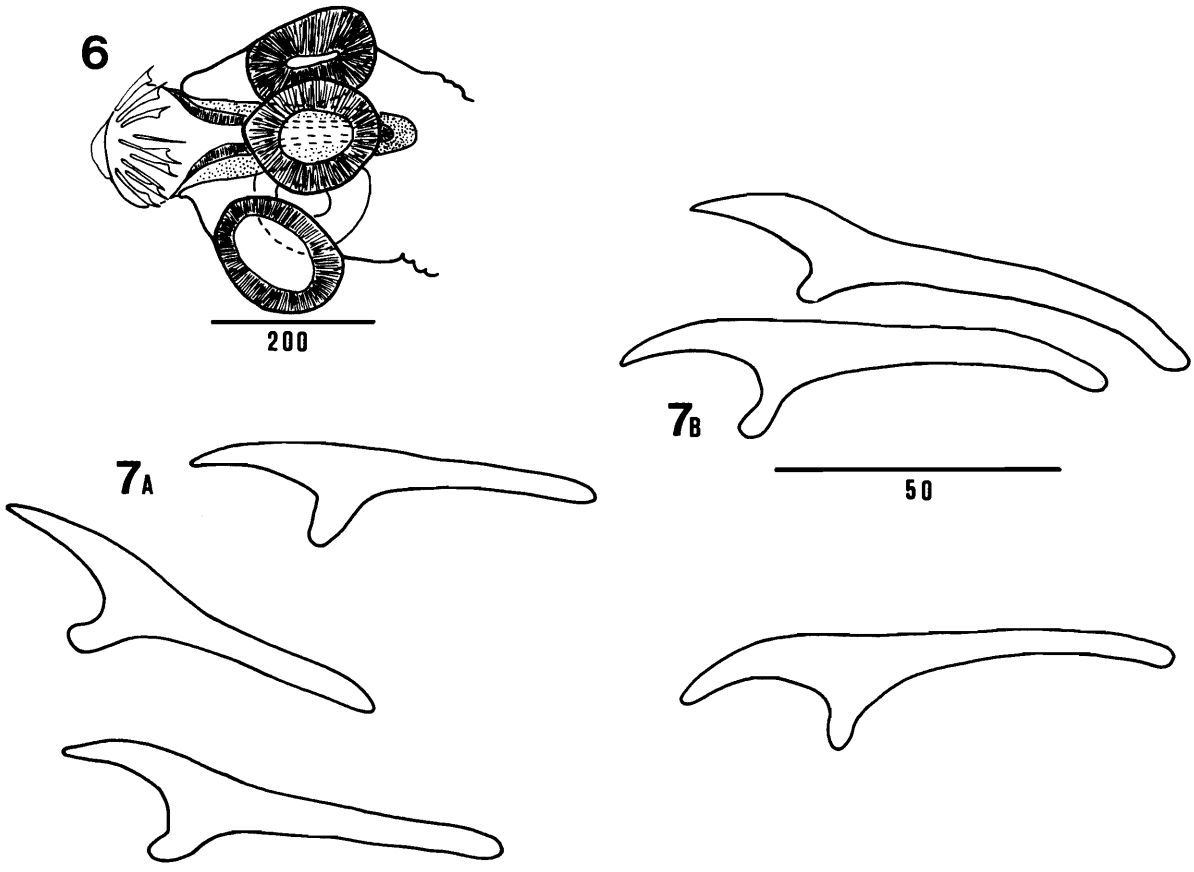
Discussion

Alcataenia campylacantha (Krabbe, 1869) was originally described by Krabbe (1869) from black guillemots, *Cepphus grylle*, collected in Greenland and the Faeroe Islands. This cestode has since been reported from its type host in the Soviet Arctic at Novaia Zemlia (Markov 1941), in the Barents Sea (Belopol'skaia 1952), on the Kola Peninsula, Murman Coast (Baylis 1919), and at Wrangel Island (Leonov and Belogurov 1970); in western Greenland and Iceland (Zschokke 1903; Baer 1956, 1962); and in the western North Atlantic (Threlfall 1971). More recently it has been found in spectacled guillemots at Sudzukhinski Reserve, Primor'e, U.S.S.R. (Belpol'skaia, 1963*a*, 1963*b*), and from Peter the Great Bay near Vladivostok, U.S.S.R. (Smetanina, 1979). *Alcataenia campylacantha* was also reported by Threlfall (1971) from common murres, *Uria aalge* (Pontoppidan), and by Skriabin (1926) and Matevosian (1963) from thick-billed murres, *U. lomvia* (Linnaeus). The occurrence of this cestode in pigeon guillemots in the eastern North Pacific (Gulf of Alaska and Bering Sea) constitutes new host and geographic records.

Birds of the genus *Cepphus* are typical hosts for this cestode, while records of *A. campylacantha* from other species of alcids apparently represent incidental infections. According to Matevosian (1963), Southwell (1922) reported this taxon from herons, *Egretta garzeta* (L.) and *Ardeola grayi* (Syk.) in the Calcutta Zoo. Southwell (1922) did not report *A. campylacantha* from either of these species of heron; rather, a different species, *Dilepis campylancristrota* (Wedl, 1855) was listed as a parasite of these birds. The similarity of the names of these cestodes may have resulted in the apparently erroneous host record. This record is certainly a mistake as indicated by Spasskaia (1971).

Spasskaia (1971) synonomized *Vitta baeri* Matevosian, 1963 with *A. campylacantha*. The former taxon had been named by Matevosian (1963) for specimens from black guillemots that Baer (1956) had redescribed as *A. campylacantha*.

Although some degree of variation occurs among populations of *A. campylacantha* from the Soviet Arctic (Skriabin 1926), the North Atlantic (Krabbe 1869; Baer 1956), and the eastern North Pacific and Bering Sea, it is not substantial in most diagnostic characters (Table 1). Specimens redescribed by Skriabin (1926) were from thick-billed murres, an atypical host, thus some morphological differences might be expected. A reexamination of Baer's (1956, 1962) and Krabbe's (1869) material showed that these cestodes were more similar to the specimens from the North Pacific than might have been indi-



FIGS. 6 and 7. *Alcataenia* sp. indet. from *Brachyramphus brevirostris*. Fig. 6. Scolex. Fig. 7. (A and B) Rostellar hooks from different specimens showing variation in form and size.

TABLE 1. A comparison of *A. campylacantha* (Krabbe, 1869) from the North Atlantic and North Pacific

	Arctic[a]	Atlantic[b]	Atlantic[c]	Atlantic[d]	North Pacific[e]
Strobila (L×W, mm)	65×2.0	120×2.0	50–60×1.5	50–60×1.6[f]	81–96×1.6–2.08
Scolex (D)	350	—	250	259–319 (304)	259–519 (379)
No. of hooks	—	22–28	30	26–30 (28)	26–33 (29)
Hooks (L)	20	19–22	21–22	20–26 (23)	21–29 (24)
Cirrus sac					
L	68	—	114–137	99–151 (125)	93–203 (153)
W	40	—	23–25	23–35 (30)	20–35 (28)
No. of testes	8–10	—	15–20	24–35 (29)	28–41 (35)
Seminal receptacle					
L	180	—	—	102–188 (136)	96–223 (146)
W	95	—	—	52–104 (74)	44–110 (77)
Vitelline gland					
L	200	—	—	110–223 (161)	116–212 (156)
W	—	—	—	35–102 (70)	44–90 (63)
No. of segments when gravid	—	—	—	Up to 280	Up to 294
Outer egg envelope (D)	—	—	—	48–67 (56)	64–90 (75)

NOTE: All measurements are in micrometres unless otherwise indicated. Numerical values in parentheses are means. L, length; W, width; D, diameter.

[a]Specimens from *Uria lomvia* (Skriabin, 1926).
[b]From *C. grylle* (Krabbe, 1869).
[c]From *C. grylle* (Baer, 1956).
[d]Reexamination of Krabbe's and Baer's specimens.
[e]Specimens from *C. columba*.
[f]Total length of strobila from Baer (1956).

cated by a comparison with their published descriptions. However, specimens from the North Pacific were slightly larger, had a greater maximum number of hooks, longer cirrus sac, a greater number of testes, and larger eggs than those reported from other localities. Five specimens (a single cestode from *C. grylle* at Point Barrow, Alaska, and four from *C. columba* at St. Matthew Island) differed from others studied from the North Pacific. In the former specimens, the hook lengths, from

15 to 17 μm, and the size of the rostellum, 102–131 μm long by 41–44 μm wide, were substantially less than in cestodes from other localities. However, these five cestodes were identical in other details with the remaining specimens from the North Pacific.

Baer (1956) did not provide data concerning the dimensions of the seminal receptacle and vitelline gland; these are given for the first time in Table 1. The relationships of the genital ducts, passing between the excretory canals, was not mentioned by Baer (1956). Spasskaia (1971), in establishing the genus *Alcataenia*, of which *A. campylacantha* is the type species, did not indicate the position of the ducts. Among other species of the genus, the course of the ducts is variable; it is between the osmoregulatory canals in specimens of *A. meinertzhageni* (Baer, 1956), *A. micracantha* (Krabbe, 1869), and *A. dominicanus* (Railliet and Henry, 1912); dorsal to the canals in *A. armillaris* (Rudolphi, 1810), *A. longicervica* Hoberg, 1984, *A. pygmaeus* Hoberg, 1984, *A. fraterculae* Hoberg, 1984 and *A. cerorhincae* Hoberg, 1984; and variable in position in *A. larina* (Krabbe, 1869) (Hoberg 1984*a*, 1984*b*, 1984*c*).

Cestodes referred to *Alcataenia* sp. indet. from Kittlitz's murrelets appear to represent an undescribed taxon. All of the specimens obtained were immature; in some, minimal development of the testes was evident. The scolex resembled that characteristic of the *A. fraterculae*-group of cestodes (Hoberg 1984*a*). Hook length in specimens of *Alcataenia* sp. (73–96 μm, $\bar{x}$ = 85) approached that of *A. cerorhincae* (96–119 μm, $\bar{x}$ = 108), and *A. larina pacifica* Hoberg, 1984 (87–111 μm, $\bar{x}$ = 101) but the blade:handle ratios of the hooks differed considerably. This ratio in *Alcataenia* sp. was 1:1.44–2.12, while in *A. cerorhincae* it was 1:0.67–1.33, and in *A. l. pacifica*, 1:0.48–0.91. Additionally, numbers of hooks and testes in specimens of *Alcataenia* sp. from murrelets were lower than in the other species mentioned.

Few cestodes have been found in murrelets of the genus *Brachyramphus* Brandt. Species of *Tetrabothrius* have been reported from marbled murrelets, *B. marmoratus* (Gmelin) (Krotov and Deliamure, 1952; E. P. Hoberg, unpublished data) but not from *B. brevirostris*. The present record constitutes the first for the occurrence of dilepidid cestodes in Kittlitz's murrelets.

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